994-2.

621.99-

TRADE (A) MARK.

ALLISON'S

Patent Socket,

FOR CONNECTING

WROUGHT-IRON TUBES.

Manufactured exclusively by

W. C. ALLISON,

PHILADELPHIA, PA.

PATTERSON & WHITE, PRS., PHILA

W. C. ALLISON,

THIRTY-SECOND AND WALNUT STREETS,
PHILADELPHIA,

MANUFACTURES

WROUGHT-IRON PIPE

LAP-WELDED

ARTESIAN, SALT, AND OIL WELL TUBING AND CASING.

CHARCOAL IRON BOILER TUBES.

REFERENCE.

Brass Work, Cast, Wrought, and Malleable Iron Fittings, Etc., Etc.

CENTENNIAL MEDAL

AWARDED FOR

ALLISON'S PATENT SOCKET.

COPY FROM AWARDS.

"The Pipe Connection is a very meritorious invention, especially for Oil Wells, having a vanishing screw which permits a bearing at all points, without weakening the tube."

SIGNED BY

First Group of Judges:

JOSEPH BELKNAP, *Chairman.*
EMIL BRUGSCH,
N. PETROFF,
F. REWLEAUX,
W. H. BARLOW,
HORATIO ALLEN,
CHARLES E. EMERY,
CHARLES T. PORTER.

Second Group of Judges:

DAVID STEINMETZ, *President.*
CHARLES STAPLES,
J. D. IMBODEN.

A true copy of the record:

FRANCIS A. WALKER,
Chief of the Bureau of Award.

Given by authority of the United States Centennial Commission.

J. C. CAMPBELL, *Secretary.*
A. T. GOSHORN, *Director-General.*
JOS. R. HAWLEY, *President.*

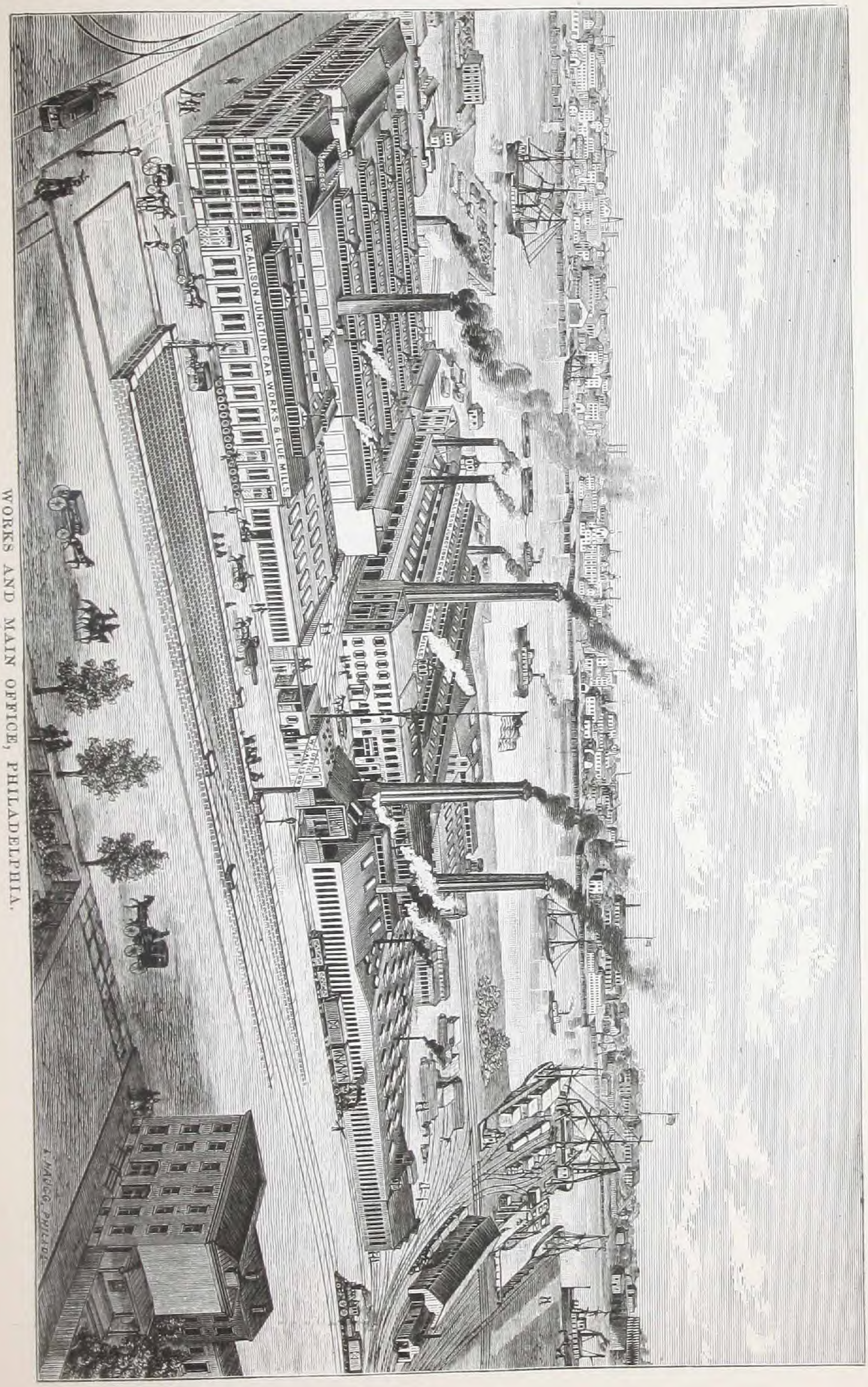
NOTICE.

TRADE (A) MARK.

THIS trade-mark is stamped on all the Tubing, Casing, and Boiler Tubes that I manufacture.

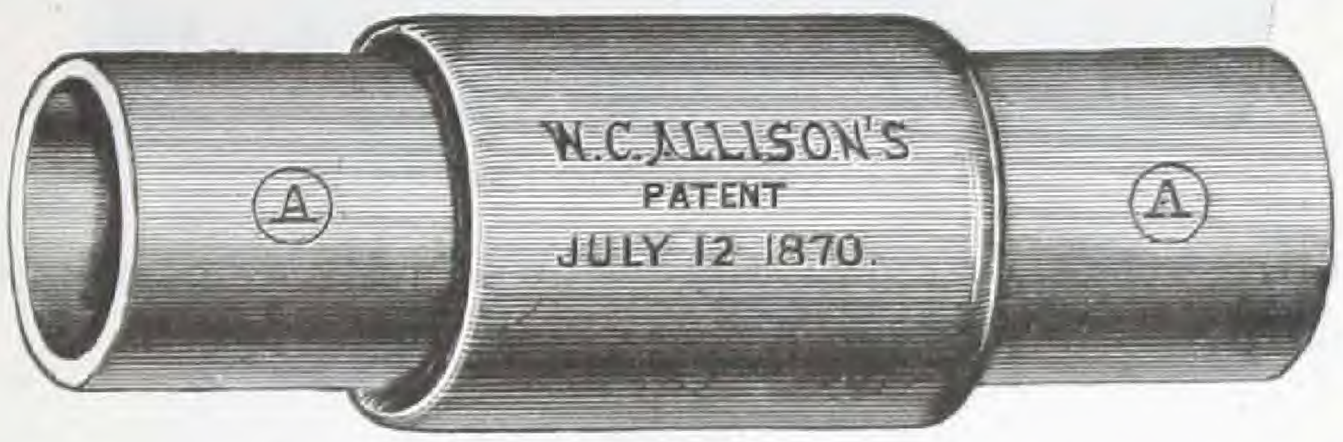
My Deep-Well Tubing and Line Pipe is tested by Hydraulic Pressure to 2000 pounds to the square inch, and when under this pressure each piece is hammered on the welding-seam its entire length.

W. C. ALLISON.


W. C. ALLISON JUNCTION CAR WORKS & FLUE MILLS
WORKS AND MAIN OFFICE, PHILADELPHIA.

ALLISON PATENT VANISHING THREAD.

I DESIRE to call particular attention to the especial merits of the Allison Patent Vanishing Thread for the coupling together of Wrought-Iron Welded Tubes.



This invention was patented July 12, 1870. Letters-patent No. 105,290.

The screw is cut on the pipe with a regular taper on the upper part of the thread from one end to the other, and, after leaving four threads of full depth at the beginning of the screw, the depth of the threads is decreased on a regular taper at their base until they vanish at the shoulder of the screw. The socket or coupling is tapped at each end with corresponding screws, so that when the pipes are screwed into the sockets there is a continuous contact of all the threads from one end to the other, and, the threads having vanished, there is no incision in the pipe to make it liable to break at the shoulder of the socket under any strain which would not break it at any other point in its entire length. This is plainly shown in

FIG. 1.

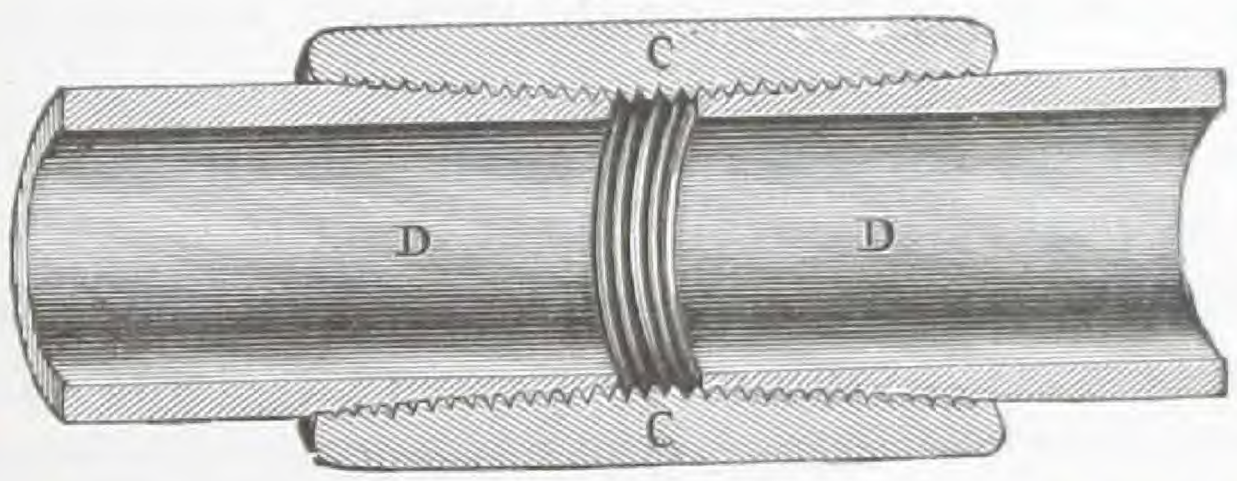
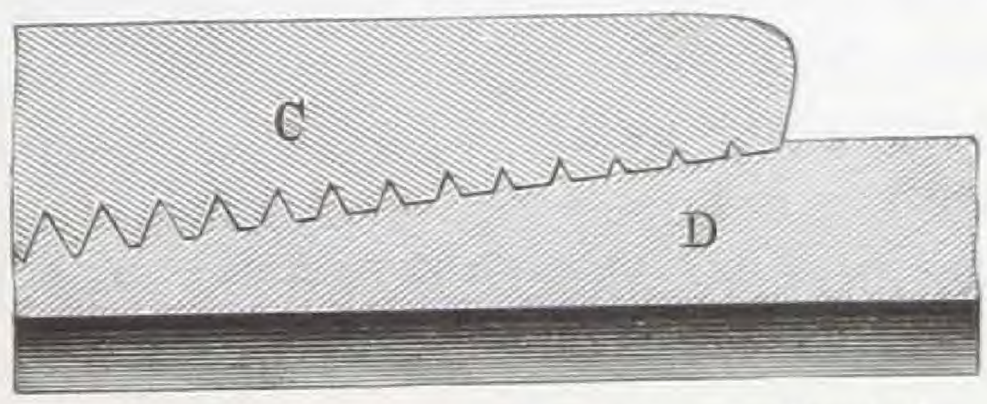


Fig. 1, which represents a longitudinal section of two pipes, D, D, connected by socket, C, and in Fig. 2, which represents a quarter-

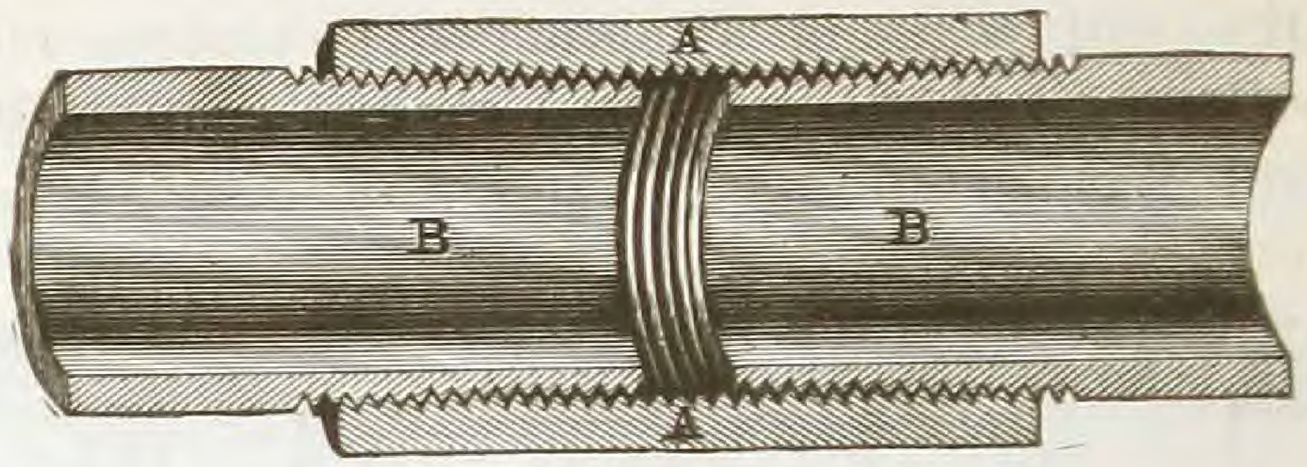
FIG. 2.



section of Fig. 1, enlarged to render the principle of the improvement more apparent.

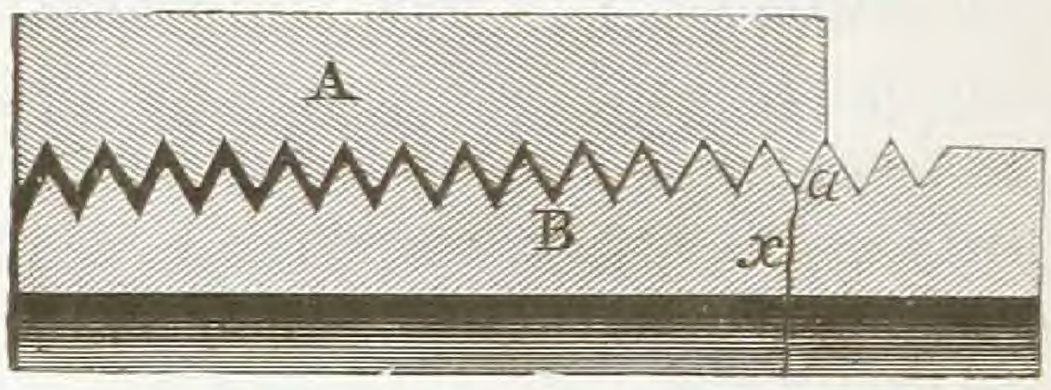
To illustrate the superiority of this improvement by comparison, I insert Fig. 3, representing a longitudinal section of two pipes, B, B,

FIG. 3.



connected by socket, A, and Fig. 4, which is a quarter-section of Fig. 3, enlarged to show the defects more plainly.

FIG. 4.



These cuts, Figs. 3 and 4, show the customary or Standard method of connecting wrought-iron pipes by cutting on them slightly tapering screws with threads of uniform depth, and tapping straight through the socket corresponding threads without any taper, so that in screwing them together the tapering threads on the pipe would find a bearing in three or four of the straight threads of the socket, and would leave one or two threads on the pipes uncovered, and a large portion of those inside without support from contact with the socket.

For pipes used to conduct gas or steam this method of connecting had always proved sufficient, but it would not stand the severe strain to which pipes used in pumping oil, salt, and artesian wells were subjected. In these wells pipes are suspended in strings, frequently of from eighteen hundred to two thousand feet, and the heavy pumping pressure and vibration has caused them to break at the end of the socket, as represented at point *x*, Fig. 4. Also, on account of the limited contact of the threads on the pipes with those in the socket, there has been a constant liability of their becoming loosened by the vibration to which they were subjected, and of separating and dropping to the bottom of the well.

All these difficulties are overcome by the use of the Allison Patent Vanishing Thread, the advantages of which over all other methods of connecting pipes may be enumerated as follows: There is a perfect metallic contact throughout between the socket and the tube, making a perfect and secure joint like a screw-wedge.

There is no abrupt shoulder (like A, Fig. 4) at the termination of the screw on the tube, and hence no incision or weak point at this place, as in *x*, Fig. 4; but, as shown in Fig. 2, the greatest amount of metal in the entire screw of the tube is at this point, which, as has been previously stated, is the place, more than all others, that requires the greatest strength.

The socket is an integral part of the tubing, and from its perfect connection with the tubes makes the joints of a number of pieces of tubing, connected this way, the strongest parts of the entire length of tubing.

The screws in the socket and on the tube are much longer than in the Standard. The taper is very gradual, and the ends of the tubing, if necessary, could be made to meet.

These features enable long lines of connected tubes to be made perfectly straight, and, when suspended, to be free from any crookedness caused by the joints, an advantage only attained by the use of the Allison Patent Vanishing Thread.

The socket is not liable to be easily loosened; the vanishing threads, the perfect screw-wedge character of the coupling, makes the screwing and unscrewing of the socket an advantage, it serving as the process of making a perfect ground joint.

In conducting experiments, the following tests were made to show the relative differences between the two methods of connecting tubes just described.

A piece of two-inch tube, with our patent socket screwed on it, separated at a distance from the socket under a tensil strain of 65,000 pounds to the square inch, the screws and all the threads on the socket and tubing remaining in a perfect condition. Another part of the same piece of tubing, with the usual Standard socket screwed on it, yielded under a tensil strain of 37,000 pounds, the tube separating in and near end of the socket (at the incision *x*, Fig. 4). Another time the tubing was pulled out of the Standard socket, stripping the few threads that were in contact.

One of our two-inch patent sockets was screwed by machinery to a piece of tubing; the socket was then taken off, and after the operation was repeated one hundred and sixty times, all the threads, both on the socket and on the tube, were found, on close examination, to be as perfect as when the operation commenced, showing that by this process the joints were absolutely ground together.

The same severe test was applied to the Standard socket; but on screwing it the tenth time the tubing broke off, separating at the incision *x*, Fig. 4.

Two pieces of tubing, connected by our patent socket, were submitted to a direct pressure on the socket, and showed a maximum

deflection of over 28,000 pounds. The same experiment was tried with the sockets of other manufacturers on the tube, and the highest deflective pressure sustained by any of them was less than 20,000 pounds.

Other experiments conclusively proved that the style of thread we have adopted is by far the best method now in use for coupling wrought-iron tubes, and is not susceptible of farther improvement.

Fig. 5 represents a longitudinal section of two-inch pipe, full size, screwed with the Standard Steam-Pipe Thread.

Fig. 6 represents a longitudinal section of two-inch pipe, full size, screwed with the Allison Patent Vanishing Thread.

A comparison of these plainly shows the value of the improvement above described.

In addition to the use of our socket for the purposes we have specially mentioned, it makes an excellent joint for truss and connecting rods and braces formed of connected iron or tubing; also for iron pile-driving, iron light-houses, bridges, and other classes of building construction.

LINE PIPE.

Wrought-iron welded pipe has been for many years largely used for conducting oil, water, and gas long distances, particularly in the oil regions of Pennsylvania, where hundreds of miles of these lines are now in operation. For connecting these pipes the Allison Patent Vanishing Thread has been found to be particularly valuable, as it resists the great strain from the pressure of the pumps used in forcing the oil through the pipes, and from the expansion and contraction caused by changes of temperature, and prevents loss of oil by leakage at the sockets.

The growing necessities of trade requiring increased facilities for cheap transportation of oil to market induced the use of pipes of larger calibre than had formerly been deemed necessary, and it was then found that the metal in the pipes was not sufficiently thick at the joints to stand the increased strain caused by the use of more powerful pumps, and by the greater distance between pumping stations. To remedy this difficulty without using greater thickness of iron, in making the pipes powerful hydraulic machinery was used to upset their ends, increasing them to one and three-eighths times their original thickness, so that when the screw-threads are cut on them the thickness of metal, measured from the inside of the pipe to the bottom of the thread, is but a trifle less than the thickness of the pipe. Also, as the upset ends swell gradually from the outside of the pipe to the shoulder of the socket, that point which in straight pipes is the

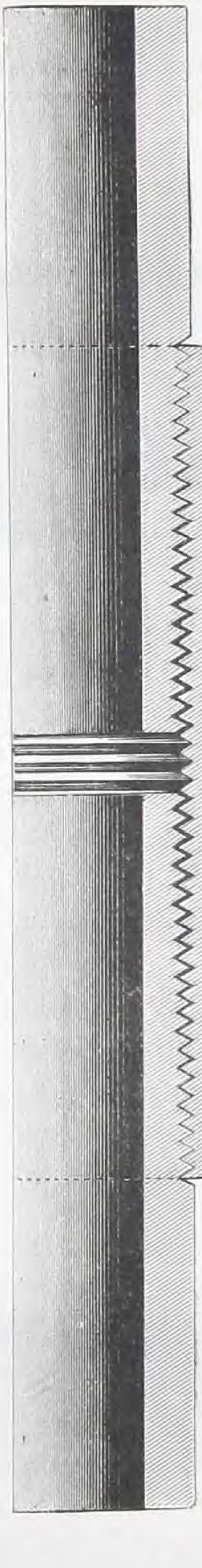


FIG. 5.

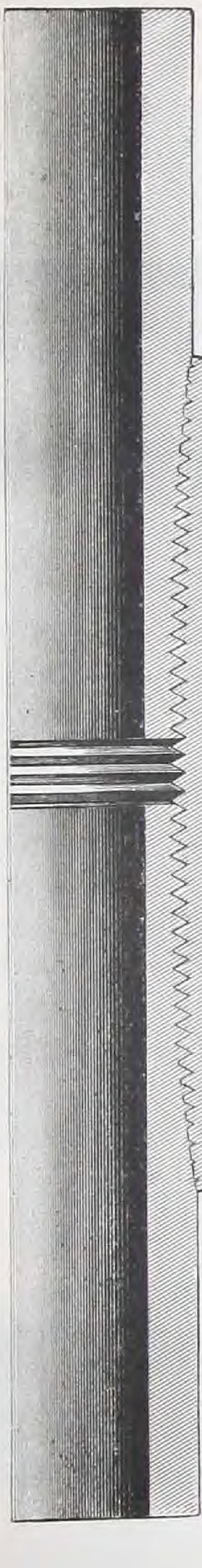


FIG. 6.

weakest actually becomes in this the strongest part. This improvement is illustrated by Fig. 7, representing longitudinal sectional strips (full size) of six-inch Line Pipe with upset ends and socket coupling them together, all having the Allison Patent Vanishing Thread. Since the introduction of this pipe into the market, it has made a record unequalled by any other Line Pipe in use.

FIG. 8.

Fig. 8 represents a longitudinal half elevation and half section of a one and a quarter inch tube-coupling, showing the exterior and interior forms of the upset joint with patent vanishing thread.

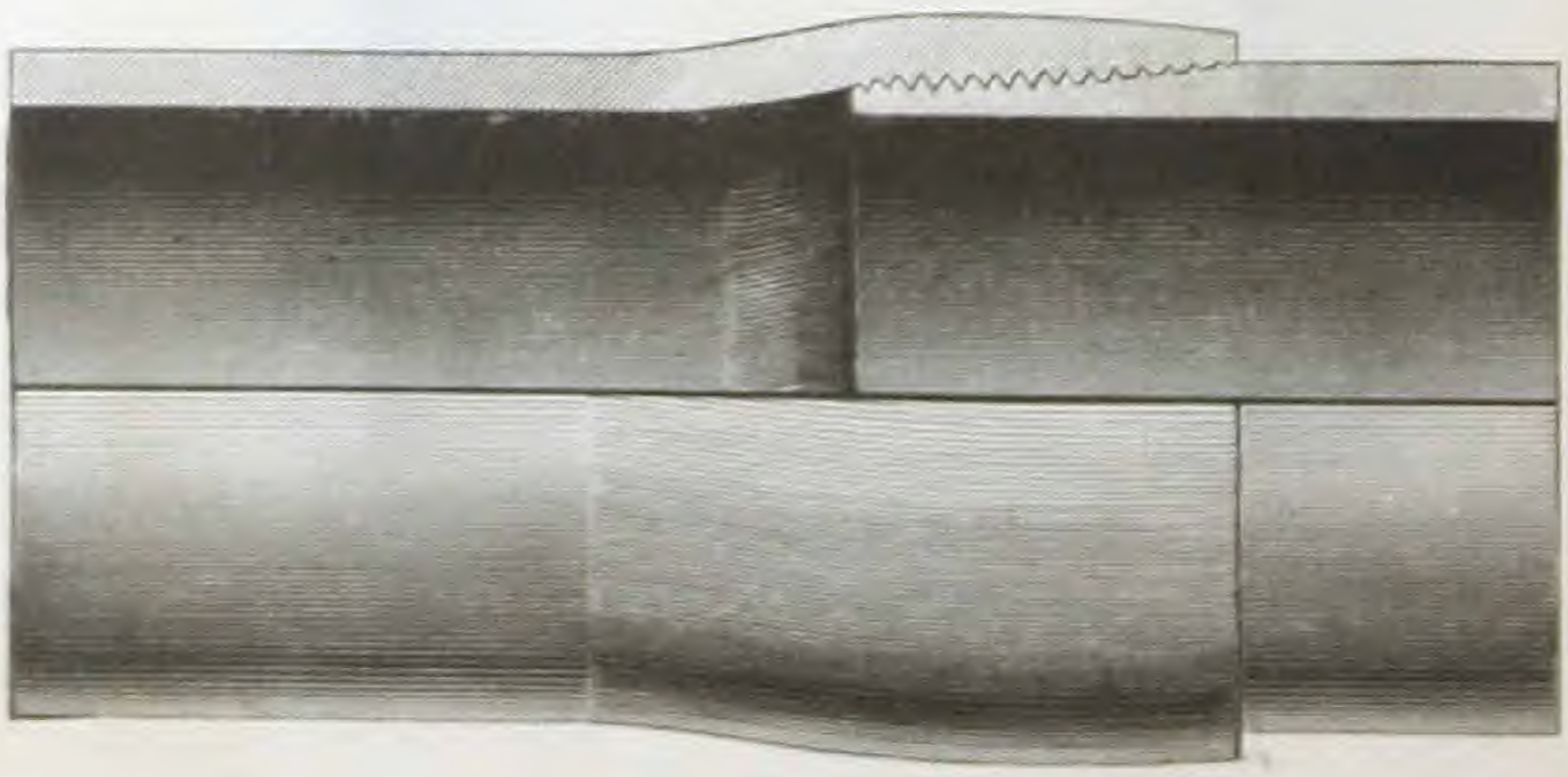
Fig. 9 represents a longitudinal sectional strip of one and a quarter inch tube and coupling, showing actual dimensions of iron used in making the one and a quarter inch joint.

Fig. 10 represents a two-inch casing joint with upset ends.

Fig. 11 represents an eight and a quarter inch casing joint with upset ends, the thickness of metal at the termination of the sockets being almost twice that of the casing. This style of goods is particularly applicable for use in localities not supplied with railroads, where transportation is expensive, it being much lighter than Standard pipe, and quite as strong at the joints.

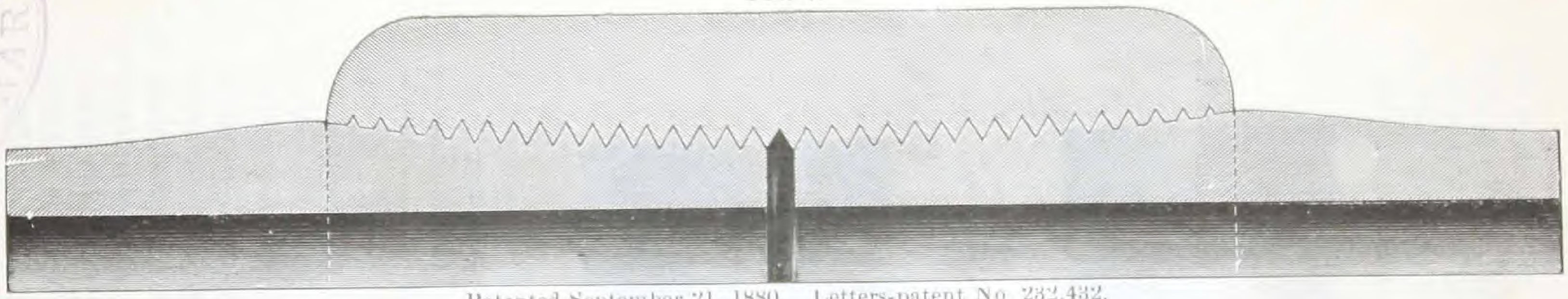
Fig. 12 represents a longitudinal half elevation and half section of a two-inch inserted tube-joint.

FIG. 12.



W. C. ALLISON, PHILADELPHIA.

FIG. 7.



Patented September 21, 1880. Letters-patent No 232,432.

FIG. 9.

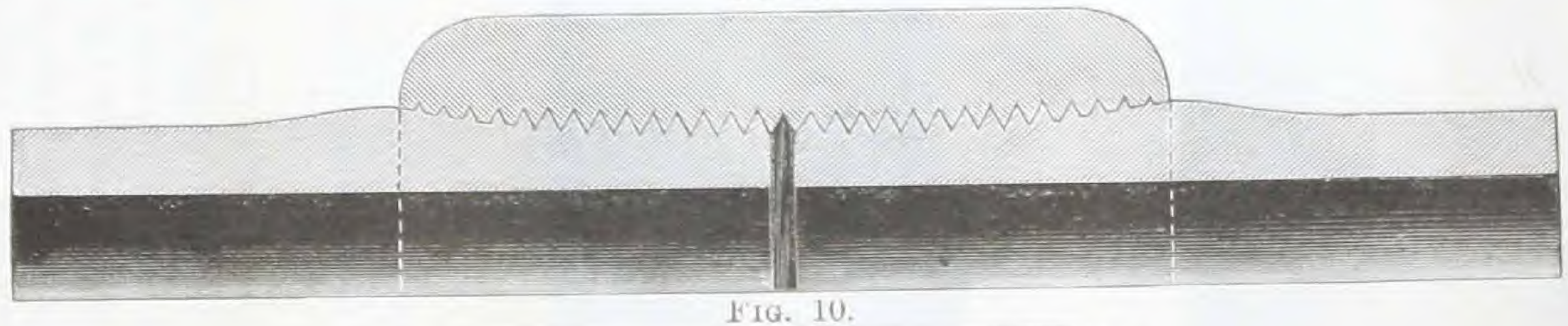


FIG. 10.

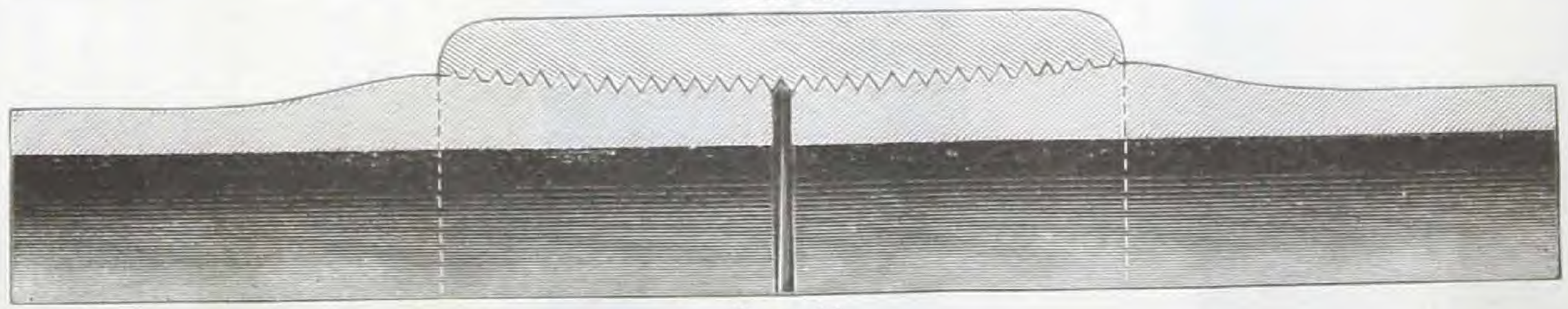


FIG. 11.

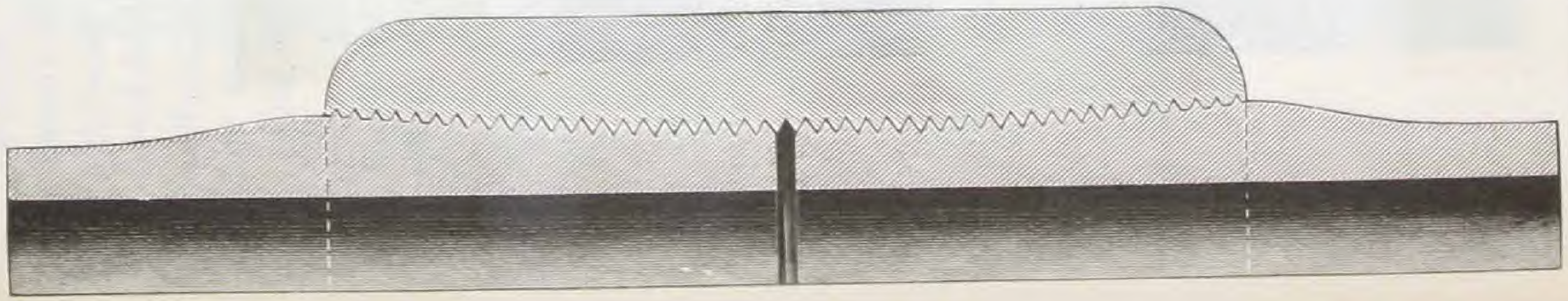
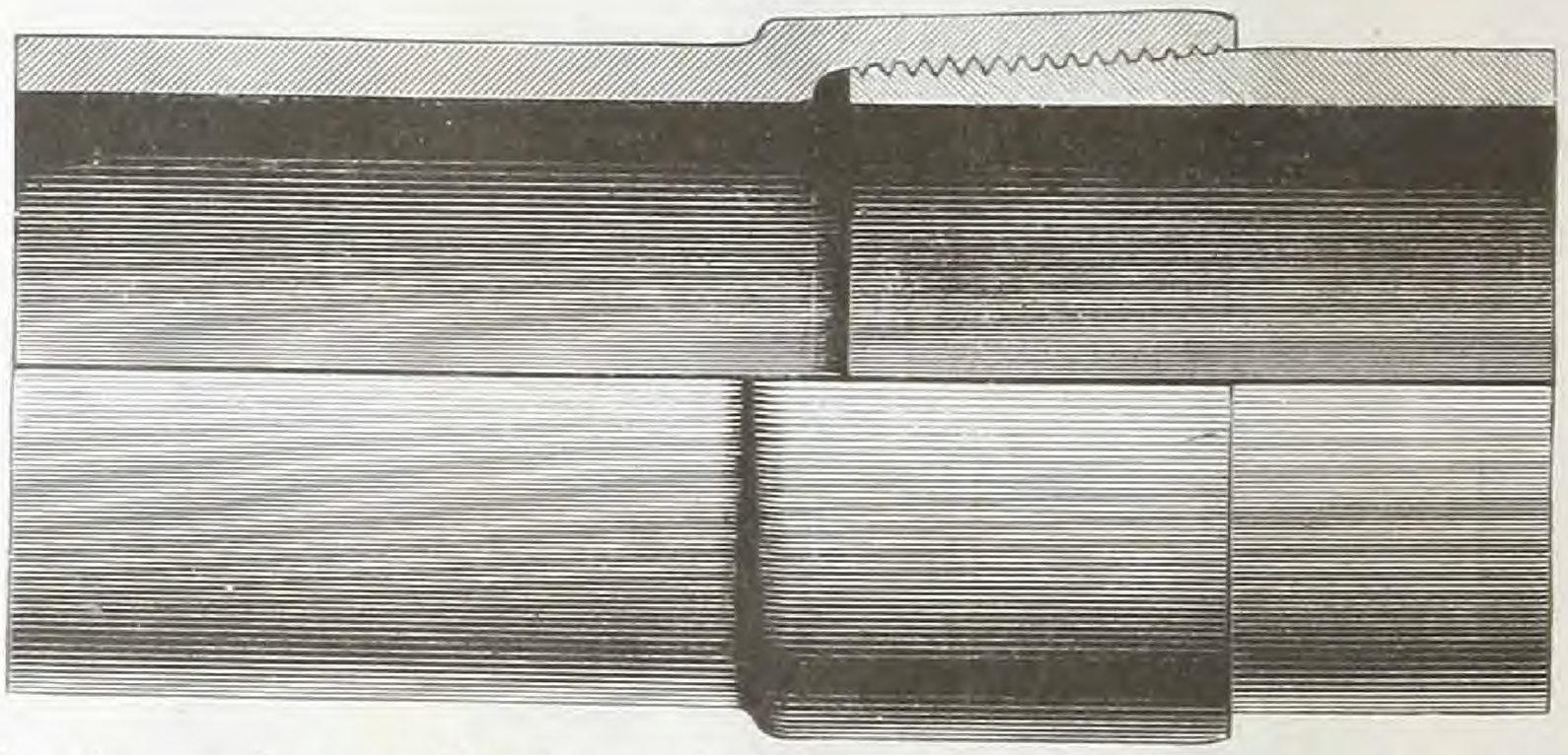


Fig. 13 represents a longitudinal sectional strip of a nine-inch inserted pipe-joint.

The expanded ends of these pipes are upset to a thickness which makes the metal from the outside of the pipe to the bottom of the thread as thick as the body of the pipe; the expanded portion swells gradually from the outside diameter of the pipe to the shoulder, increasing in thickness as it becomes larger in diameter; the threads have a compound taper, being of full depth in centre and vanishing at shoulder and at end of the screw. The end of the pipe which forms connection with the expanded end is screwed with corresponding threads. This is the strongest inserted joint pipe in the market, and is especially applicable to artesian wells in which pipe with socket joints cannot be used.

Fig. 14 represents a longitudinal half elevation and half section of a two-inch inserted joint pipe with sharp shoulder. The sharp

FIG. 14.



shoulder is made to afford a point for the tools to take hold when it needs to be drawn out of the well.

FIG. 15.

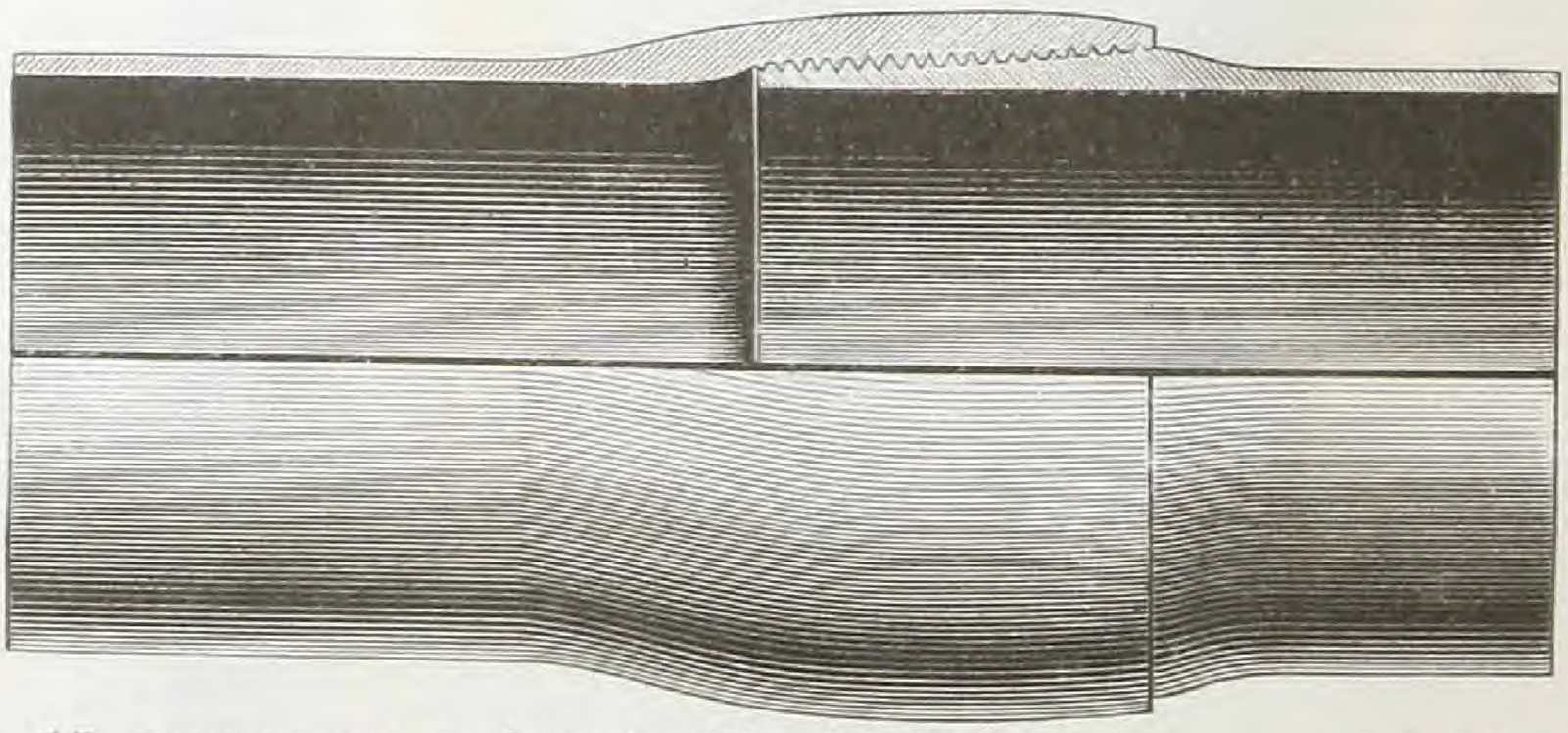


Fig. 15 represents a longitudinal half elevation and half section of a two-inch casing inserted joint with both ends upset.

And Fig. 16 represents a longitudinal sectional strip of a two-inch inserted casing joint with both ends upset to nearly double the size of the casing.

Patented April 29, 1879. Letters-patent No. 214,804.

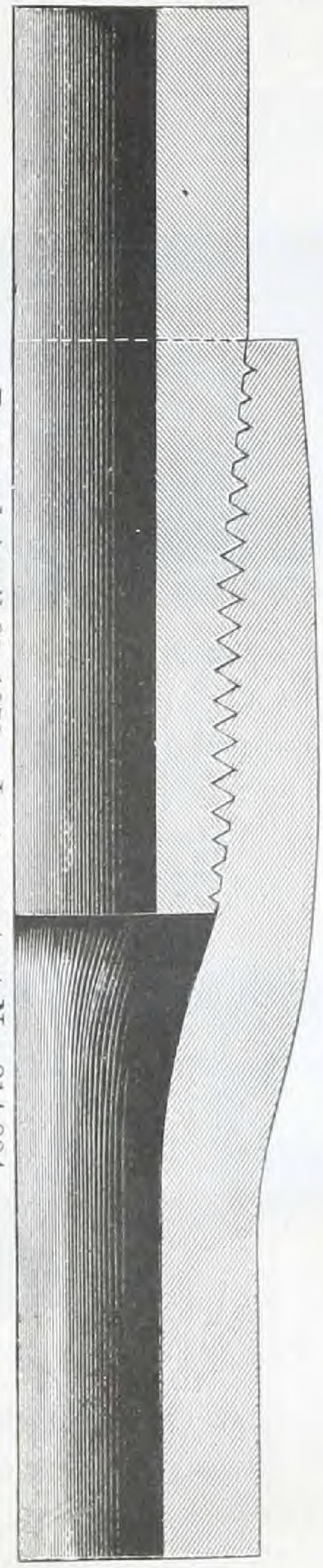


FIG. 13.

FIG. 16.

Fig. 17 represents a longitudinal sectional strip of an eight and a quarter inch inserted casing joint with both ends upset.

Fig. 18 represents a longitudinal half elevation and half section of a two-inch boiler tube with the end upset, making it one-third thicker than the body of the tube. The additional thickness of the tube where it goes through the tube sheet and meets the greatest portion of heat, will make it last longer than a tube with ends of ordinary thickness.

FIG. 18.

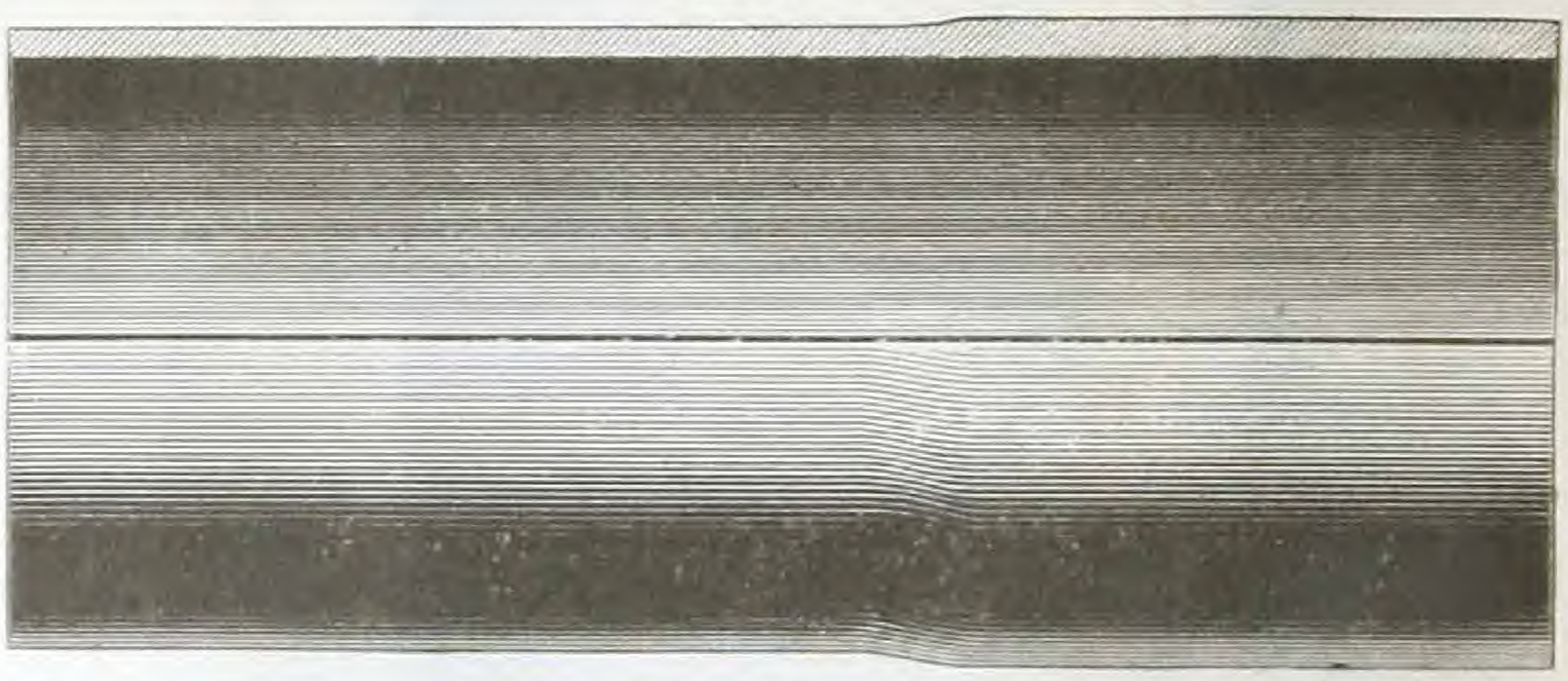
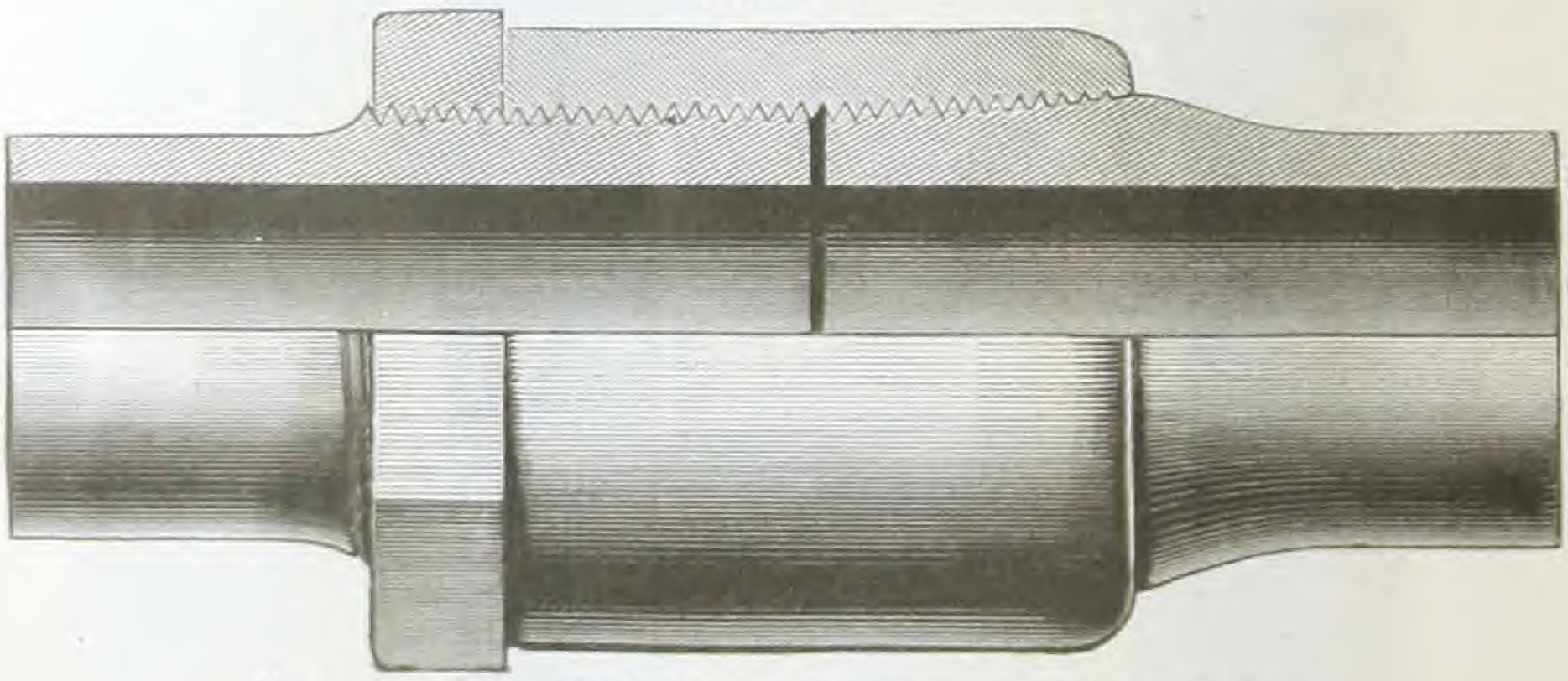


Fig. 19 represents a longitudinal half elevation and half section of a one and a quarter inch union joint for use in long lines of pipe instead of long screws or flange unions. The ends of two pipes are upset thick

FIG. 19.



Patented July 12, 1881. Letters-patent No. 244,157.

enough to admit of the socket, which connects them, passing over the body of the pipe. One end is screwed with the Allison Patent Vanishing Thread, the other with a straight thread long enough to fill half the socket and leave room for a lock-nut to be screwed up against it. This union is stronger than a long screw, not liable to leak, and is much more quickly and easily disconnected and rejoined than either long screw or flange union.

Fig. 20 represents a longitudinal half elevation and half section of a one and a quarter inch well-pole joint, showing the interior and

FIG. 17.

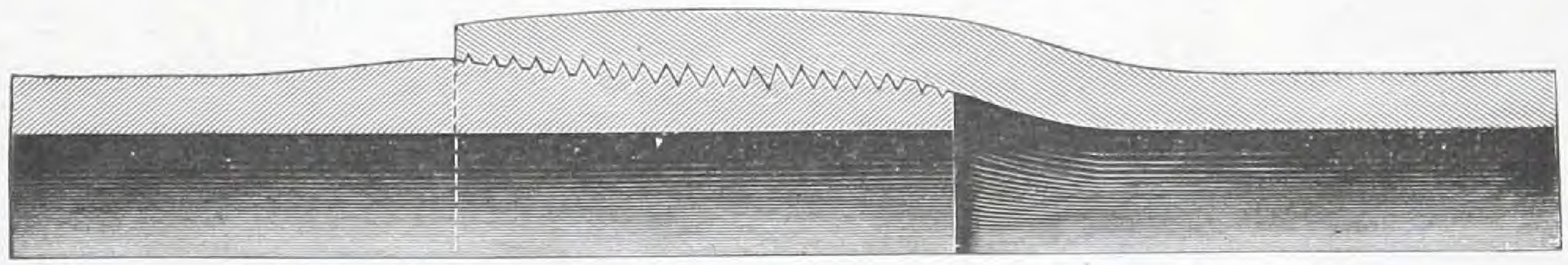
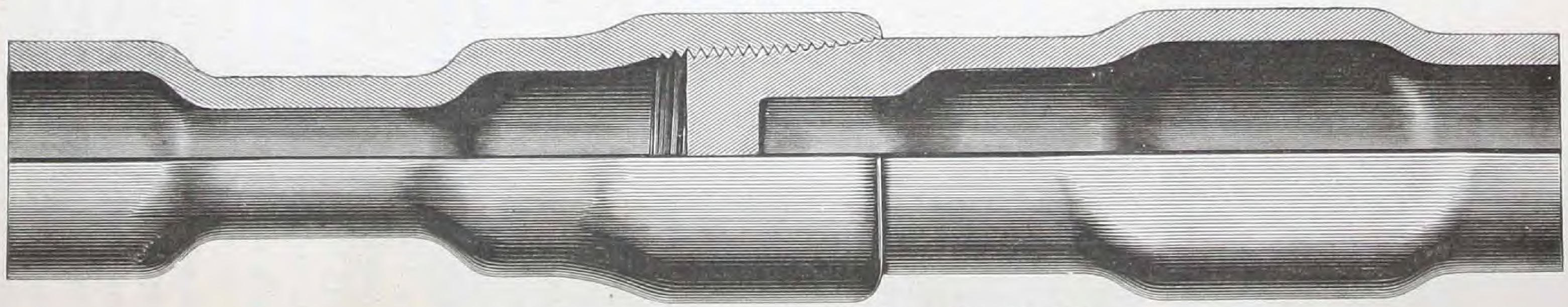


FIG. 20.



Patented May 3, 1881. Letters-patent No. 240,877.

exterior form thereof. One end of the pipe is upset and expanded large enough to receive a one and a quarter inch pipe, and the two are screwed with the Allison Patent Vanishing Thread. Into the end which is not expanded an iron plug is welded to prevent the passage of fluids through the well poles, and every section is flattened at a short distance from each end to admit of its being effectively grasped by a wrench to screw the joints together.

Fig. 21 represents an improved Drive-Shoe, made of wrought-iron forging, with a steel ring shrunk on its lower end to form its cutting-edge, the outside diameter at the lowest part being larger than the outside of the sockets connecting the sections of drive-pipe. The upper inside of the shoe is tapped with the Allison Patent Vanishing Thread, and is screwed on a length of drive-pipe, the end of which is upset, and has a corresponding thread; the lower end of the pipe rests on a shoulder in the shoe of the same width as the thickness of the pipe, thus preventing the thread being injured by the force of the blows used in driving. The inside of the Drive-Shoe is of the same diameter as the inside of the drive-pipe.

There are many needs for the use of wrought-iron pipe, where, from its being subjected to contact with water, brine, or other substances affecting it chemically, it is soon destroyed. This difficulty has been, in a great measure, overcome by galvanizing or coating it with zinc; but as the threads of the screws were always cut after the pipe was galvanized, there were at the joints portions of the iron exposed to the action of the destructive agents. To overcome this I cut the screws before the pipe is galvanized, and after it is covered with the zinc burnish the metal-coated threads so that they remain completely covered and make a tight joint.

This metal-coated pipe has been very successfully used in the manufacture of salt.

Patented April 8, 1879. Letters-patent No. 214,076.

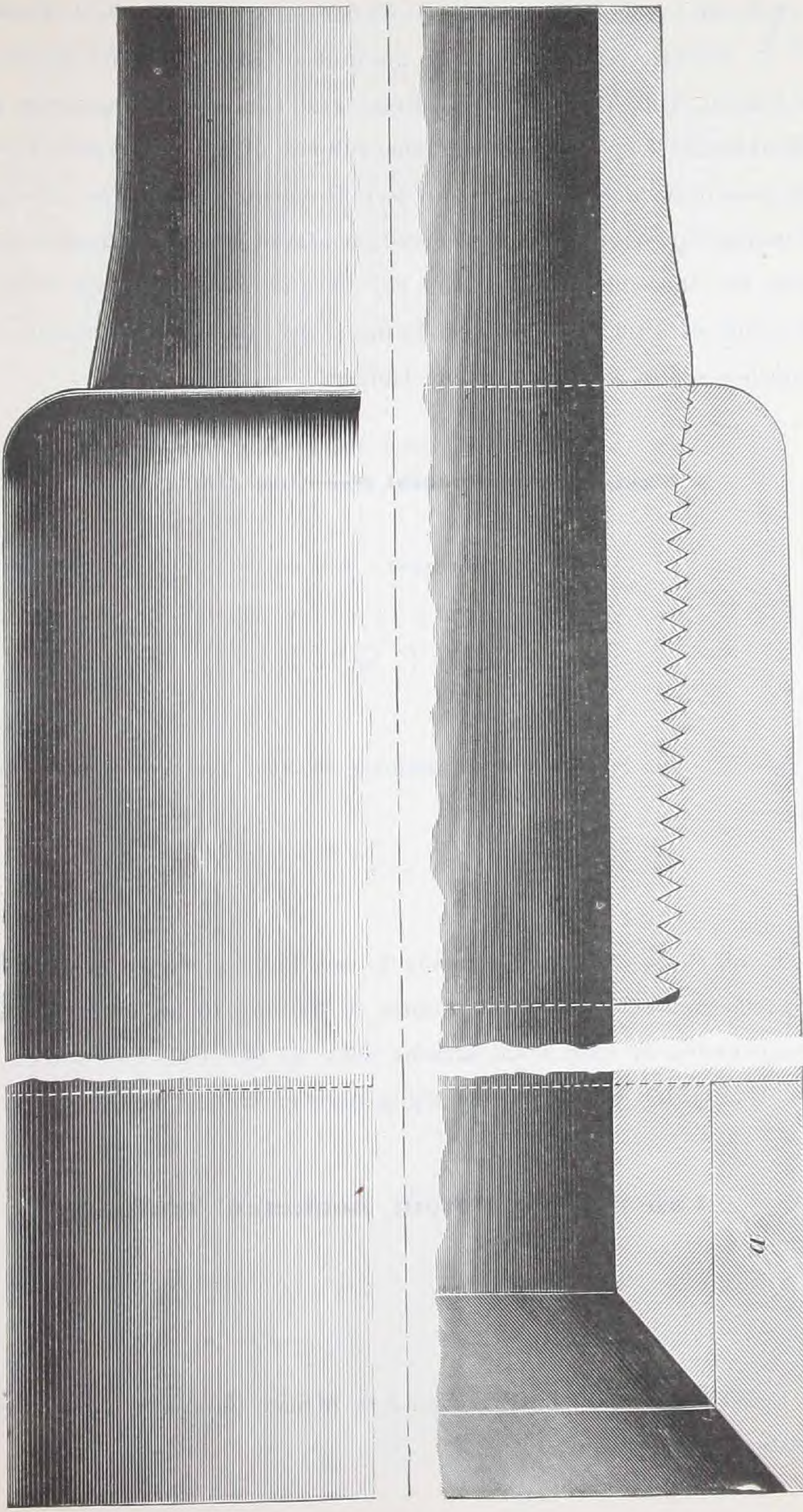


FIG. 21.

Patented July 12, 1881. Letters-patent No. 244,023.

AT the recent CENTENNIAL EXHIBITION the ALLISON PATENT SOCKET received a large amount of attention and favorable comment from the industrial Press and the ablest Engineers and Mechanical Experts, and was the subject of special report by the Representative Experts of our own Government and the principal Foreign Governments. I received, as stated, special favorable mention for this invention in the report and award on my General Exhibit of PIPE AND BOILER TUBES; and, in addition thereto, by another set of very competent Judges,

A Separate and Special Premium and Award,

EXCLUSIVELY FOR MY

PATENT SOCKET,

WHICH IS THE FIRST AND ONLY PREMIUM AWARDED FOR A TUBE COUPLING.

To all those who have occasion to use Tubing requiring a perfect security against breaking at joints, or Tubing to be subjected to a compressive or suspended strains, such as in Coils, Drive Well, or Oil Wells, etc., I would respectfully invite a trial of my

Lap-Welded Patent Socketed Tubing.

Upon application, I will be glad to furnish Sample Sockets, Price Lists, and Catalogues.

IN addition to the specialties stated on first page, I manufacture all kinds of

RAILROAD CARS,

Bolts, Nuts, and Washers,

WROUGHT AND CAST-IRON WORK

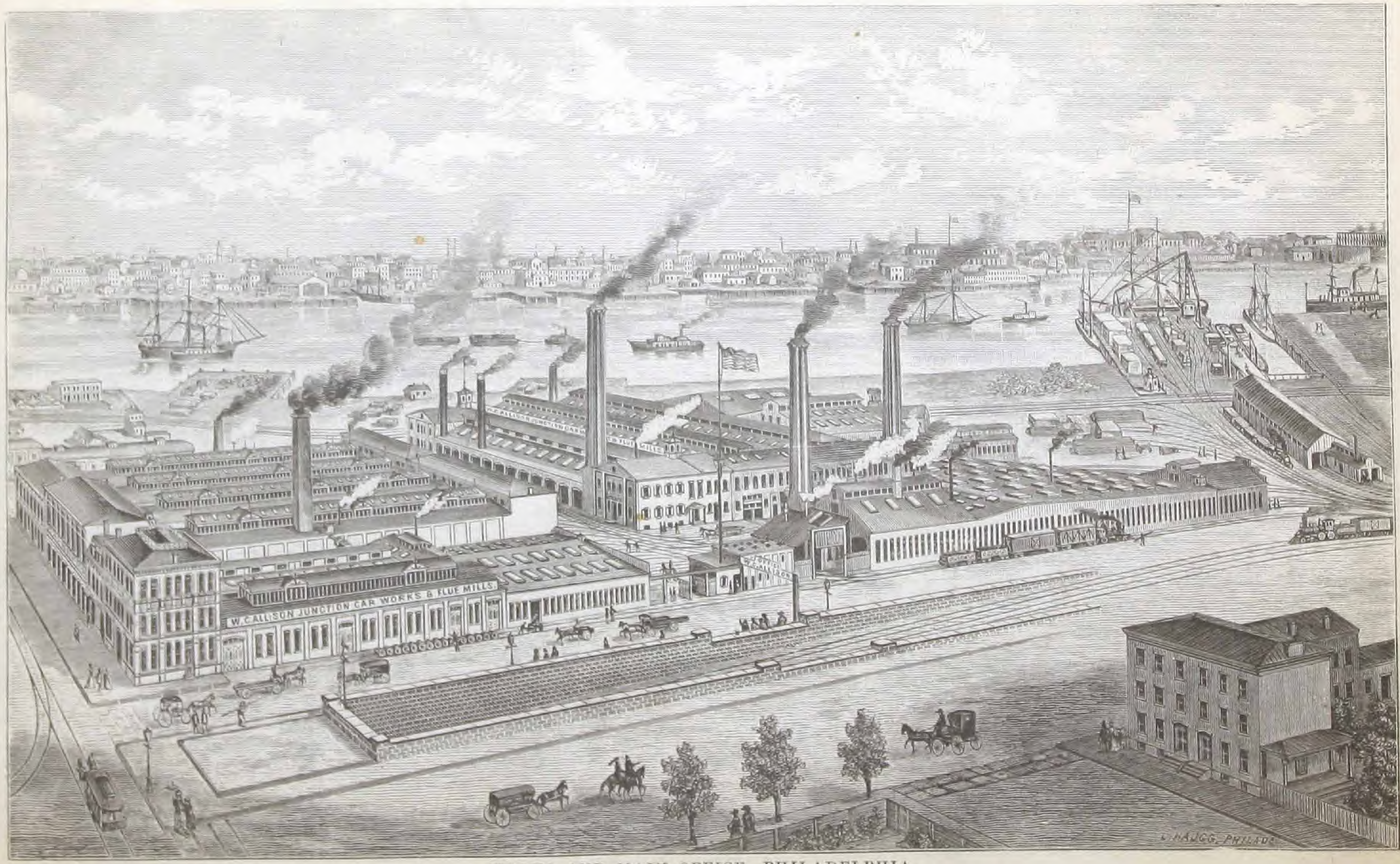
FOR

CARS, BUILDINGS, AND BRIDGES.

ALSO, FURNISH ALL KINDS OF

RAILROAD SUPPLIES, TOOLS,

ETC., ETC., ETC.



WORKS AND MAIN OFFICE, PHILADELPHIA.